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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/725,933	12/03/2003	Wen-Kun Yang	HK9225US	4487

22203 7590 10/29/2007
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EXAMINER

ZARNEKE, DAVID A

ART UNIT	PAPER NUMBER
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2891

MAIL DATE	DELIVERY MODE
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10/29/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/725,933

Applicant(s)

YANG ET AL.

Examiner

David A. Zarneke

Art Unit

2891

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 August 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 30,31,37-41 and 48-56 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 30,31,37-41 and 48-56 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 8/7/07 has been entered.

Response to Arguments

Applicant's arguments filed 8/7/07 have been fully considered but they are not persuasive.

Three arguments were submitted in response to the rejection of the claims.

The first argument was that Gengel fails to teach an adhesion layer between the die and the base.

Please note that the use of an adhesion layer is conventionally well known to a skilled artisan. An adhesion layer would allow for a strong bond to the base. The use of conventional materials to perform their known functions is obvious (MPEP 2144.07).

The second argument is that Gengel fails to teach a buffer layer made of silicon rubber, epoxy, resin or BCB.

Please note that the use of a buffer layer in place of the material of Gengel would have been an obvious equivalent material known to a skilled artisan. A skilled artisan would use a buffer layer to improve stress release. The substitution of one known equivalent technique for another may be obvious even if the prior art does not expressly suggest the substitution (Ex parte Novak 16 USPQ 2d 2041 (BPAI 1989); In re Mostovych 144 USPQ 38 (CCPA 1964); In re Leshin 125 USPQ 416 (CCPA 1960); Graver Tank & Manufacturing Co. V. Linde Air Products Co. 85 USPQ 328 (USSC 1950).

The third argument is that Gengel fails to teach the claimed materials for the contact layer and the conductive layer.

Please note that the claimed materials are known equivalent materials to the one's recited in Gengel, which recites the use of Cu, Ag, Au, Cr, etc as the contact layer and the conductive layer and the use of more than one metal (5,63 - 6, 10). A skilled artisan would know that the claimed materials are known equivalent materials to the one's in Gengel. The substitution of one known equivalent technique for another may be obvious even if the prior art does not expressly suggest the substitution (Ex parte Novak 16 USPQ 2d 2041 (BPAI 1989); In re Mostovych 144 USPQ 38 (CCPA 1964); In re Leshin 125 USPQ 416 (CCPA 1960); Graver Tank & Manufacturing Co. V. Linde Air Products Co. 85 USPQ 328 (USSC 1950).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 30, 31, 37-41 and 48-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gengel, US Patent 6,417,025.

Gengel (figure 4A-4N) teaches a fan out type package structure, comprising:

a base [406];

a die [410] having a plurality of pads on a top surface that is opposite a bottom surface;

a first dielectric layer [404] formed on said base and filling in a space except said first die on said base;

a second dielectric layer [412] formed on said first dielectric layer and said first die, wherein said second dielectric layer includes a plurality of opening [414] for contact with said plurality of pads;

a contact conductive layer [416] formed on said plurality of pads of said die and within said opening to electrically couple with said pads, respectively;

a plurality of conductive lines [416] formed on said second dielectric layer and in contact with said contact conductive layer substantially filling said opening, and said conductive lines extended out from corresponding said contact conductive layer to corresponding end points;

an isolation layer [420] formed on said conductive lines and said second dielectric layer; and

solder balls [424] passing through said isolation layer and welded on said conductive lines for coupling said conductive lines, respectively.

Regarding the limitation of the contact conductive layer and the conductive lines are both presumed to be separate layers. While Gengel fails to teach the use of two separate layers, the transposition of process steps or the splitting of one step into two, where the processes are substantially identical or equivalent in terms of function,

manner and result, was held to not patentably distinguish the processes [Ex parte Rubin 128 USPQ 440 (PTOBdPatApp 1959)]. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the two separate steps in the invention of Gengel because one can better control the flow of the conductive material into the opening when performed separately.

Further, in a product claim, only the final structure is considered. Therefore, how one arrived at a structure wherein the contact conductive layer and the conductive lines are formed is not given any patentable weight. All that is required is a structure having a contact conductive layer in an opening and a conductive line coupled thereto. The fact that Gengel teaches forming them at the same time and the claims intend to have them formed separately is not given any patentable weight. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

With respect to the limitation that the contact conductive layer substantially fill the opening, the partial filling of the opening taught by Gengel and the presently claimed substantially filled opening are equivalent techniques used to form a contact in an opening in order to electrically connect the underlying pad to the conductive line formed above the contact conductive layer. They are interchangeable techniques used to

perform this function. The substitution of one known equivalent technique for another may be obvious even if the prior art does not expressly suggest the substitution (Ex parte Novak 16 USPQ 2d 2041 (BPAI 1989); In re Mostovych 144 USPQ 38 (CCPA 1964); In re Leshin 125 USPQ 416 (CCPA 1960); Graver Tank & Manufacturing Co..V. Linde Air Products Co. 85 USPQ 328 (USSC 1950).

As to the limitation requiring an adhesion material between the die and the base, the use of conventional materials to perform their known functions is obvious (MPEP 2144.07). An adhesion layer is conventionally known to skilled artisans and is used to attach a die to a substrate, as evinced by Quirk et al., Semiconductor Manufacturing Technology, Prentice-Hall, 2001, p 576.

Regarding claim 31, Gengel teaches the surfaces of said first dielectric layer and said first die are at same level (figure 4N).

With respect to claim 34, while Gengel fails to teach the said first die is formed by sawing a processed base, this is a product-by-process limitation. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). Further, acquiring a die from a process that saws the die from a base is conventionally known in the art.

Regarding claim 37, Gengel teaches said first contact conductive layer comprises Ti, Cu, and the combination thereof (5, 63+).

With respect to claim 38, Gengel teaches said first conductive lines comprise Ni, Cu, Au, and the combination thereof (5, 63+).

As to claim 39, while Gengel, which teaches a thermally conductive (4, 9+ & 18+) isolating base, fails to teach a material of said isolating base is glass, silicon, ceramic, or crystal material, it would have been obvious to one of ordinary skill in the art at the time of the invention to use an isolating base made of glass, silicon, ceramic, or crystal material because all of these materials are commonly known materials used as an isolation base. The substitution of one known equivalent technique for another may be obvious even if the prior art does not expressly suggest the substitution (Ex parte Novak 16 USPQ 2d 2041 (BPAI 1989); In re Mostovych 144 USPQ 38 (CCPA 1964); In re Leshin 125 USPQ 416 (CCPA 1960); Graver Tank & Manufacturing Co. V. Linde Air Products Co. 85 USPQ 328 (USSC 1950).

In re claim 40, while Gengel fails to teach an epoxy layer formed on back surface of the base, it would have been obvious to one of ordinary skill in the art at the time of the invention to form an epoxy layer on the back of the base because it is conventionally known in the art. A skilled artisan would form an epoxy layer on the back of the base in order to protect the base during the dicing process. The use of conventional materials to perform there known functions in a conventional process is obvious (MPEP 2144.07).

Regarding claim 41, while Gengel teaches the isolating layer is made of silicon dioxide, it would have been obvious to one of ordinary skill in the art at the time of the

invention to use an epoxy, resin or combinations thereof as the isolating layer in the invention of Gengel because they are equivalent materials known to skilled artisans to be used in this manner. The substitution of one known equivalent technique for another may be obvious even if the prior art does not expressly suggest the substitution (Ex parte Novak 16 USPQ 2d 2041 (BPAI 1989); In re Mostovych 144 USPQ 38 (CCPA 1964); In re Leshin 125 USPQ 416 (CCPA 1960); Graver Tank & Manufacturing Co. V. Linde Air Products Co. 85 USPQ 328 (USSC 1950).

With respect to claim 48, while Gengel fails to teach the said first die is formed by sawing a processed base and adhered to said base by a picking and placing system, this is a product-by-process limitation. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698,227 USPQ 964, 966 (Fed. Cir. 1985). Further, acquiring a die from a process that saws the die from a base and adheres it to said base by a picking and placing system is conventionally known in the art.

As to claim 49, while Gengel fails to teach said first dielectric layer includes silicon rubber, epoxy, resin or BCB to act as a buffer layer to release the stress, it would have been obvious to one of ordinary skill in the art at the time of the invention to use silicon rubber, epoxy, resin or BCB in the invention of Gengel because silicon rubber,

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epoxy, resin or BCB are known equivalent dielectric materials. The substitution of one known equivalent technique for another may be obvious even if the prior art does not expressly suggest the substitution (Ex parte Novak 16 USPQ 2d 2041 (BPAI 1989); In re Mostovych 144 USPQ 38 (CCPA 1964); In re Leshin 125 USPQ 416 (CCPA 1960); Graver Tank & Manufacturing Co. V. Linde Air Products Co. 85 USPQ 328 (USSC 1950).

In re claim 50, while Gengel fails to teach adhesion material includes thermally conductive material, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a thermally conductive adhesion material in the invention of Gengel because a thermally conductive adhesion material is conventionally known in the art to skilled artisans. The use of conventional materials to perform their known functions is obvious (MPEP 2144.07).

Claims 51-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gengel, US Patent 6,417,025.

Gengel (figure 4A-4N) teaches a fan out type package structure, comprising:

a base [406];

a die [410] having a plurality of pads on a top surface that is opposite a bottom surface;

a first dielectric layer [404] formed on said base and filling in a space except said first die on said base;

a second dielectric layer [412] formed on said first dielectric layer and said first die, wherein said second dielectric layer includes a plurality of opening [414] for contact with said plurality of pads;

a contact conductive layer [416] formed on said plurality of pads of said die and within said opening to electrically couple with said pads, respectively;

a plurality of conductive lines [416] formed on said second dielectric layer and in contact with said contact conductive layer substantially filling said opening, and said conductive lines extended out from corresponding said contact conductive layer to corresponding end points;

an isolation layer [420] formed on said conductive lines and said second dielectric layer; and

solder balls [424] passing through said isolation layer and welded on said conductive lines for coupling said conductive lines, respectively.

Regarding the limitation of the contact conductive layer and the conductive lines are both presumed to be separate layers. While Gengel fails to teach the use of two separate layers, the transposition of process steps or the splitting of one step into two, where the processes are substantially identical or equivalent in terms of function, manner and result, was held to not patentably distinguish the processes [Ex parte Rubin 128 USPQ 440 (PTOBdPatApp 1959)]. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the two separate steps in the invention of Gengel because one can better control the flow of the conductive material into the opening when performed separately.

Further, in a product claim, only the final structure is considered. Therefore, how one arrived at a structure wherein the contact conductive layer and the conductive lines are formed is not given any patentable weight. All that is required is a structure having a contact conductive layer in an opening and a conductive line coupled thereto. The fact that Gengel teaches forming them at the same time and the claims intend to have them formed separately is not given any patentable weight. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

With respect to the limitation that the contact conductive layer substantially fill the opening, the partial filling of the opening taught be Gengel and the presently claimed substantially filled opening are equivalent techniques used to form a contact in an opening in order to electrically connect the underlying pad to the conductive line formed above the contact conductive layer. They are interchangeable techniques used to perform this function. The substitution of one known equivalent technique for another may be obvious even if the prior art does not expressly suggest the substitution (Ex parte Novak 16 USPQ 2d 2041 (BPAI 1989); In re Mostovych 144 USPQ 38 (CCPA 1964); In re Leshin 125 USPQ 416 (CCPA 1960); Graver Tank & Manufacturing Co. V. Linde Air Products Co. 85 USPQ 328 (USSC 1950).

As to the limitation requiring an adhesion material between the die and the base, the use of conventional materials to perform their known functions is obvious (MPEP 2144.07). An adhesion layer is conventionally known to skilled artisans and is used to attach a die to a substrate, as evinced by Quirk et al., *Semiconductor Manufacturing Technology*, Prentice-Hall, 2001, p 576.

In re the first dielectric layer being a buffer layer made of silicon rubber, epoxy, resin or BCB to act as a buffer layer to release the stress, while Gengel fails to teach the use of a buffer layer, it would have been obvious to one of ordinary skill in the art at the time of the invention to use silicon rubber, epoxy, resin or BCB in the invention of Gengel because silicon rubber, epoxy, resin or BCB are known equivalent dielectric materials. The substitution of one known equivalent technique for another may be obvious even if the prior art does not expressly suggest the substitution (*Ex parte Novak* 16 USPQ 2d 2041 (BPAI 1989); *In re Mostovych* 144 USPQ 38 (CCPA 1964); *In re Leshin* 125 USPQ 416 (CCPA 1960); *Graver Tank & Manufacturing Co. V. Linde Air Products Co.* 85 USPQ 328 (USSC 1950).

Regarding claims 52 and 53, while Gengel, which teaches the use of Cu, Ag, Au, Cr, etc and the use of more than one metal (5,63 - 6, 10), fails to teach the contact layer comprise Ti and Cu (claim 52) and the conductive lines comprise Cu, Ni and Au (claim 53), it would have been obvious to one of ordinary skill in the art at the time of the invention to use Ti and Cu contact layers and Cu, Ni and Au conductive lines in the invention of Gengel because both Ti and Cu contact layers and Cu, Ni and Au conductive lines are conventionally known in the art materials used to form a contact

layers and conductive lines. Skilled artisans know that Ti, Cu Ni and Au are conventional materials used to form interconnection layers. The use of conventional materials to perform their known functions is obvious (MPEP 2144.07).

In re claim 54, while Gengel fails to teach adhesion material includes thermally conductive material, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a thermally conductive adhesion material in the invention of Gengel because a thermally conductive adhesion material is conventionally known in the art to skilled artisans. The use of conventional materials to perform their known functions is obvious (MPEP 2144.07).

Claims 55-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gengel, US Patent 6,417,025.

Gengel (figure 4A-4N) teaches a fan out type package structure, comprising:

- a base [406];
- a die [410] having a plurality of pads on a top surface that is opposite a bottom surface;
- a first dielectric layer [404] formed on said base and filling in a space except said first die on said base;
- a second dielectric layer [412] formed on said first dielectric layer and said first die, wherein said second dielectric layer includes a plurality of opening [414] for contact with said plurality of pads;
- a contact conductive layer [416] formed on said plurality of pads of said die and within said opening to electrically couple with said pads, respectively;

a plurality of conductive lines [416] formed on said second dielectric layer and in contact with said contact conductive layer substantially filling said opening, and said conductive lines extended out from corresponding said contact conductive layer to corresponding end points;

an isolation layer [420] formed on said conductive lines and said second dielectric layer; and

solder balls [424] passing through said isolation layer and welded on said conductive lines for coupling said conductive lines, respectively.

Regarding the limitation of the contact conductive layer and the conductive lines are both presumed to be separate layers. While Gengel fails to teach the use of two separate layers, the transposition of process steps or the splitting of one step into two, where the processes are substantially identical or equivalent in terms of function, manner and result, was held to not patentably distinguish the processes [Ex parte Rubin 128 USPQ 440 (PTOBdPatApp 1959)]. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the two separate steps in the invention of Gengel because one can better control the flow of the conductive material into the opening when performed separately.

Further, in a product claim, only the final structure is considered. Therefore, how one arrived at a structure wherein the contact conductive layer and the conductive lines are formed is not given any patentable weight. All that is required is a structure having a contact conductive layer in an opening and a conductive line coupled thereto. The fact that Gengel teaches forming them at the same time and the claims intend to have them

formed separately is not given any patentable weight. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

With respect to the limitation that the contact conductive layer substantially fill the opening, the partial filling of the opening taught be Gengel and the presently claimed substantially filled opening are equivalent techniques used to form a contact in an opening in order to electrically connect the underlying pad to the conductive line formed above the contact conductive layer. They are interchangeable techniques used to perform this function. The substitution of one known equivalent technique for another may be obvious even if the prior art does not expressly suggest the substitution (Ex parte Novak 16 USPQ 2d 2041 (BPAI 1989); In re Mostovych 144 USPQ 38 (CCPA 1964); In re Leshin 125 USPQ 416 (CCPA 1960); Graver Tank & Manufacturing Co. V. Linde Air Products Co. 85 USPQ 328 (USSC 1950).

As to the limitation requiring an adhesion material between the die and the base, the use of conventional materials to perform their known functions is obvious (MPEP 2144.07). An adhesion layer is conventionally known to skilled artisans and is used to attach a die to a substrate, as evinced by Quirk et al., Semiconductor Manufacturing Technology, Prentice-Hall, 2001, p 576.

In re the first dielectric layer being a buffer layer made of silicon rubber, epoxy, resin or BCB to act as a buffer layer to release the stress, while Gengel fails to teach the use of a buffer layer, it would have been obvious to one of ordinary skill in the art at the time of the invention to use silicon rubber, epoxy, resin or BCB in the invention of Gengel because silicon rubber, epoxy, resin or BCB are known equivalent dielectric materials. The substitution of one known equivalent technique for another may be obvious even if the prior art does not expressly suggest the substitution (Ex parte Novak 16 USPQ 2d 2041 (BPAI 1989); In re Mostovych 144 USPQ 38 (CCPA 1964); In re Leshin 125 USPQ 416 (CCPA 1960); Graver Tank & Manufacturing Co. V. Linde Air Products Co. 85 USPQ 328 (USSC 1950).

Regarding the materials used for the contact layer and the conductive lines, while Gengel, which teaches the use of Cu, Ag, Au, Cr, etc and the use of more than one metal (5,63 - 6, 10), fails to teach the contact layer comprise Ti and Cu (claim 52) and the conductive lines comprise Cu, Ni and Au (claim 53), it would have been obvious to one of ordinary skill in the art at the time of the invention to use Ti and Cu contact layers and Cu, Ni and Au conductive lines in the invention of Gengel because both Ti and Cu contact layers and Cu, Ni and Au conductive lines are conventionally known in the art materials used to form a contact layers and conductive lines. Skilled artisans know that Ti, Cu Ni and Au are conventional materials used to form interconnection layers. The use of conventional materials to perform their known functions is obvious (MPEP 2144.07).

In re claim 56, while Gengel fails to teach adhesion material includes thermally conductive material, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a thermally conductive adhesion material in the invention of Gengel because a thermally conductive adhesion material is conventionally known in the art to skilled artisans. The use of conventional materials to perform their known functions is obvious (MPEP 2144.07).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David A. Zarneke whose telephone number is (571)-272-1937. The examiner can normally be reached on M-Th 7:30 AM-6 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Baumeister can be reached on (571)-272-1722. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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/David A. Zarneke/
Primary Examiner
October 21, 2007